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10/822,066	04/08/2004	Tom Fawcett	200310087-1	2089

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EXAMINER	
BHARADWAJ, KALPANA	

ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/822,066	FAWCETT ET AL.	
	Examiner	Art Unit	
	Bharadwaj Kalpana	2129	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 April 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to applicant's arguments entered April 17, 2007 for the patent application 10/822,066 filed on April 08, 2004.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 1-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Arnold (US 2004/0243692, referred to as **Arnold**). The applicant's invention is referred to as **Fawcett.**

As to Claim 1,

Arnold discloses a method of identifying at least one exceptional managed system amongst a set of comparable managed systems, each managed system (**Arnold, ¶**

0001: storage systems) having a number of system configuration attributes, the method comprising:

selecting a set of managed systems; (**Arnold,** ¶ 0022: storage-using application, storage infrastructure)

selecting a set of parameterizations relating to the managed systems; (**Arnold,** ¶ 0044: group of constraints.) (The applicant discloses (**Fawcett,** ¶ 0017) that parameterization is a constraint.)

determining a pattern for each of the parameterizations based on the system configuration attributes; (**Arnold,** ¶ 0023: configuration information)

comparing substantially each of the managed systems to substantially each of the patterns; (**Arnold,** ¶ 0045: comparing allocation request, 0049 checked against the attributes) and

isolating a managed system based on the comparing (**Arnold,** ¶ 0045: associating an allocation request);

wherein the patterns are determined by a supervised machine learning algorithm.

Arnold does not explicitly disclose a machine learning algorithm. However, (**Arnold,** ¶ 0004: learning resource allocation policies, Fig 1, application server), to one skilled in the art, a machine-learning algorithm is inherent when a computer system is used for processing the learning process.

As to Claim 2,

Arnold discloses the method of claim 1, wherein the managed systems are computer systems. (**Arnold,** ¶ 001)

As to Claim 3,

Arnold discloses the method of claim 2, wherein the system configuration attributes include at least one of the following:

operating system patches; (**Arnold,** ¶ 0022: operating systems)

active processes;

installed application software programs;

memory configuration; (**Arnold,** ¶ 0022: local memory) and

peripheral devices. (**Arnold,** ¶ 0022: disk drives)

As to Claim 4,

Arnold discloses a method of claim 1, wherein selecting of the set of managed systems includes classification of the systems in accordance with a system attribute. (**Arnold,** ¶ 0026: service class comprising availability, space requirements).

As to Claim 5,

Arnold discloses a method according to claim 1, further comprising allocating a resource to any system that has been isolated. (**Arnold,** abstract: allocation of storage resources).

As to Claim 6,

Arnold discloses a method according to claim 1, wherein the set of parameterizations includes at least one parameterization relating to operating system patches. (Arnold, ¶ 0022: operating system services).

As to Claim 7,

Arnold discloses a method according to claim 5, wherein the set of parameterizations includes at least one parameterization relating to operating patches and the step of allocating a resource to the system includes an analysis of whether at least one operating patch should be installed or removed from a system. (Arnold, ¶ 0022: the step of specifying constraints; operating system services).

As to Claim 8,

Arnold discloses a method according to claim 1, further comprising assigning a priority value to an isolated system. (Arnold, ¶ 0045: determining the capabilities of the storage system in terms of the levels of performance).

As to Claim 9,

Arnold discloses a method according to claim 8, further comprising compiling a list of isolated systems and ordering the isolated systems in accordance with their priority

values. (Arnold, ¶ 0052: analyzing capabilities of the computer storage system and forming analysis results.)

As to Claim 10,

Arnold discloses a method according to claim 8, further comprising allocating a resource in accordance with priority values. (Arnold, ¶ 0052: associating an allocation request).

As to Claim 11,

Arnold discloses a method according to claim 1, wherein the supervised machine-learning algorithm is a rule learning algorithm. (Arnold, ¶ 0044: usage patterns). As is evident by the applicant's own admission, a pattern is a model or a set of rules (see 0018). Therefore, a rule-learning algorithm is inherent in Arnold's disclosure because he uses usage patterns to model his system and a pattern is a set of rules.

As to Claim 12,

Arnold discloses a method according to claim 1, further comprising annotating an isolated system with a measure (Arnold, ¶ 0017: measurement and analysis for possible reallocation and Fig. 6) indicative of the results of the comparing, wherein the measure is based on at least one of the following:.

an extent of deviation from a pattern; (Arnold, ¶ 0044: quality-of-service)

a degree of support for a pattern; (Arnold, ¶ 0044: quality-of-service)

a confidence level of a pattern; (Arnold, ¶ 0044: quality-of-service)

an assessment of the significance of a pattern (Arnold, ¶ 0044: quality-of-service for certain usage patterns); or

a cumulative number of patterns from which the system deviates. (Arnold, ¶ 0044: quality-of-service)

To a person with ordinary skills in the art, a method indicative of the extent of deviation, degree of support, confidence level, assessment of the significance of a pattern and/or the cumulative number of patterns from which the system deviates are all inherently a part of quality-of-service because by definition, a quality-of-service is a measure or assessment of a system or model.

As to Claim 13,

Arnold discloses s a method according to claim 12, further comprising compiling a list of isolated systems ordered in accordance with said measures. (Arnold, ¶ 0017: measurement and analysis for possible reallocation; ¶ 0044: quality-of-service.)

The art of compiling a list of systems that are ordered based on priority in accordance to the quality of service measures is well known in the art, because priority and ordering are methods of sorting which are primitive algorithms found in any text book on data structures, ex Introduction to algorithms by Cormen, Leiserson et al.

As to Claim 14,

Arnold discloses a system for identifying exceptional managed systems (Arnold, ¶ 0036: selecting only those policies that are relevant to storage allocation management)

amongst comparable managed systems, each managed system having a number of system configuration attributes, the system comprising:

a selection component that selects a set of managed systems; (Arnold, ¶ 0022: storage-using application, storage infrastructure).

a supervised machine learning algorithm that determines patterns for a set of parameterizations (Arnold, ¶ 0044: group of constraints.) representing constraints on the system configuration attributes for the selected set of managed systems;

a comparison component that compares the managed systems to the patterns; (Arnold, ¶ 0045: comparing allocation request; ¶ 0049: checked against the attributes).

an isolating component that isolates the managed systems that deviate from the patterns as exceptional managed systems. (Arnold, ¶ 0017: measurement and analysis for possible reallocation; ¶ 0044: quality-of-service.)

To a person with ordinary skills in the art, isolating a managed system is inherent because comparing an incoming allocation request with the available attributes and matching the request, results in isolating a system based on the comparison.

Arnold does not explicitly show a machine-learning algorithm for pattern recognition. (Arnold, ¶ 0004: learning resource allocation policies, Fig 1, application server). A machine-learning algorithm is inherent when a computer system is used for processing the learning process.

As to Claim 15,

Arnold discloses a system, wherein the selection component classifies the set of managed systems in accordance with a system attribute. (Arnold, ¶ 0026: service class comprising availability, space requirements).

As to Claim 16,

Arnold discloses a system, further comprising an allocation component that allocates a resource to the systems that have been isolated. (Arnold, abstract: allocation of storage resources)

As to Claim 17,

Arnold discloses a system according to claim 14, wherein the set of parameterizations includes at least one parameterization relating to operating system patches. (Arnold, ¶ 0022: operating system services).

As to Claim 18,

Arnold discloses a system, wherein the set of parameterizations includes at least one parameterization relating to operating patches and the allocation component conducts an analysis of whether at least one operating patch should be installed or removed from a system. (Arnold, ¶ 0022: the step of specifying constraints; ¶ 0022: operating system services).

As to Claim 19,

Arnold discloses a system, further comprising a prioritization component that assigns priority values to the isolated systems, compiles a list of isolated systems, and orders the isolated systems in accordance with their
priority values. (Arnold, ¶ 0052: measurement and analysis component, Fig 1).

As to Claim 20,

Arnold discloses a system according to claim 14, wherein the supervised machine-learning algorithm is a rule-learning algorithm. (Arnold, ¶ 0044: usage patterns).

As is evident by the applicant's own admission, a pattern is a model or a set of rules (Fawcett, 0018). A method with a rule-learning algorithm is inherent in Arnold's disclosure because he uses usage patterns to model his system and a pattern is a set of rules.

As to Claim 21,

Arnold discloses a system according to claim 14, further comprising an annotation component that annotates the isolated systems with a measure (Arnold, ¶ 0017: measurement and analysis for possible reallocation and Fig. 6) that indicates the extent to which each isolated system deviates from the patterns. (Arnold, ¶ 0044: quality-of-service)

It is noted that the annotation component is inherent because by definition, a quality-of-service is a measure or assessment of a system or model which implies a system indicative of the extent of deviation from the usage pattern.

As to Claim 22,

Arnold discloses a system for identifying exceptional managed systems amongst comparable managed systems, each managed system (Arnold, ¶ 0001: storage systems) having a number of system configuration attributes, the system comprising:

means for selecting a set of managed systems (Arnold, ¶ 0022: storage-using application, storage infrastructure);

means for determining patterns for a set of parameterizations representing constraints (Arnold, ¶ 0044: group of constraints.) on the system configuration attributes (Arnold, ¶ 0023: configuration information)

for the selected set of managed systems, according to a supervised machine-learning algorithm;

means for comparing the managed systems to the patterns; (Arnold, ¶ 0045: comparing allocation request, ¶ 0049: checked against the attributes) and

means for isolating managed systems that deviate from the patterns as exceptional managed systems. (Arnold, ¶ 0045: associating an allocation request)

Arnold does not explicitly disclose a machine learning algorithm. However, (Arnold, ¶ 0004: learning resource allocation policies, Fig 1, application server), to one skilled in

the art, a machine-learning algorithm is inherent when a computer system is used for processing the learning process.

As to Claim 23,

Arnold discloses a computer data storage media having programmed thereon computer software which performs the following functions:

selecting a set of managed systems, (Arnold, ¶ 0022: storage-using application, storage infrastructure)

each managed system having a number of system configuration attributes; (Arnold, ¶ 0023: configuration information)

selecting a set of parameterizations relating to the managed systems; (Arnold, ¶ 0044: group of constraints.)

determining a pattern for each of the parameterizations based on the system configuration attributes; (Arnold, ¶ 0023: configuration information)

comparing substantially each of the managed systems to substantially each of the patterns; (Arnold, ¶ 0045: comparing allocation request, 0049 checked against the attributes) and

isolating an exceptional managed system based on the comparing (Arnold, ¶ 0045: associating an allocation request); wherein the patterns are determined by a supervised machine learning algorithm;

Arnold does not explicitly disclose a machine learning algorithm. However, (Arnold, ¶ 0004: learning resource allocation policies; Fig 1: application server), to one skilled in

the art, a machine-learning algorithm is inherent when a computer system is used for processing the learning process.

Response to Arguments

4. Applicant's arguments filed on April 17, 2007 related to claims 1-23 have been fully considered but they are not persuasive.

In reference to Applicant's argument on page 6:

With regard to: Does Arnold teach determining a pattern for his constraints?

Examiner's response:

According to the applicant's own definition of what is considered 'patterns', (Fawcett, Background of the Invention: recognizing factors or patterns which result in certain configurations), the examiner would like to point out that patterns are mere recognizing factors. In ¶ 0044, Arnold discusses 'constraints' and 'selection of constraints', consisting of 'quality-of-service for certain usage patterns'. To a person with ordinary skills in the art, a constraint that defines a certain usage pattern is a recognizing factor or a

pattern, and 'selection of constraints' is to 'determine a pattern'.

In reference to Applicant's argument on page 7:

With regard to: comparing substantially each of the patterns to substantially each of the patterns; the applicant has argued that, 'Nowhere does Arnold discuss making comparisons of managed systems to patterns for parameterizations based on system configuration attributes.

Examiner's response:

The examiner would like to point out, ¶ 0045 where Arnold discusses, 'comparing the incoming allocation … with the most appropriate quality of service grouping.' To one with ordinary skills in the art, this is no different from comparing managed systems to patterns for parameterizations.

In reference to Applicant's second argument on page 7:

With regard to: patterns are determined by a "supervised" machine learning algorithm.

Examiner's response:

The applicant did not further define "supervised" and learning a function from its inputs and outputs reads on a "supervised" machine learning algorithm. In this light, Arnold discloses a complete process that involves, understanding application's data storage; learning resource allocation policies, etc. see ¶ *0004*. To a person with ordinary skills in the art, learning resource allocation policies based on understanding data storage is indeed a learning function with inputs and outputs.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Russell et al. teaches that a "supervised" machine learning algorithm is equivalent to learning a function from its inputs and outputs (Artificial Intelligence, A modern approach, Russell and Norvig, 2003).

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS

of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bharadwaj Kalpana whose telephone number is (571) 270-1641. The examiner can normally be reached on Monday-Friday 7:30am 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Vincent can be reached on (571) 272-3080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KB

June 21, 2007

DAVID VINCENT
SUPERVISORY PATENT EXAMINER
6/25/07